Electric Vehicles

Owner's Manual and Service Guide

C-Series: AC48-2-AC-UB-L-D and AC48-2-AC-UB-S-D

February 2015

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Introduction

Thanks for purchasing a STAR EV C-Series. For your better use, please read through this manual before operate the C-Series to avoid any possible damage due to improper operation, and keep it after reading for future reference.

Important Information: Important information is showed in following way in this manual to arouse your attention:

WARNING

Fail to follow Warning instructions could result in severe injury or death to the vehicle occupants, bystanders or persons inspecting or repairing the vehicle.

CAUTION

Fail to follow Caution instructions could cause damage to the vehicle.

Special Notice:

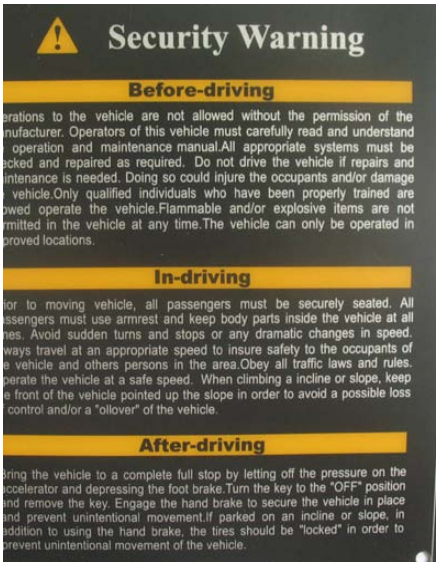
Because the seat AND backrest wrapping film may stick to the seat vinyl and cause seat vinyl fading or stained, please remove the seat & backrest wrapping film when you start to use your STAR.

Vehicle Specifications

	C-Series Standard	*C-Series Long*
Passengers	2	2
Battery group	8 x 6V, Trojan T105	8 x 6V, Trojan T105
Motor	7 HP	7 HP
Controller Power (amps)	450 Amp, AC Curtis	450 Amp, AC Curtis
Maximum speed (mph)	19.5 (20-25 LSV)	19.5 (20-25 LSV)
Cargo capacity (lbs)	550	1100
Dimensions (in)	105 x 46.5 x 74	138 x 47 x 75
Weight including batteries (lbs)	1710	2300
Ground Clearance (in)	5	5
Turing Radius (ft)	11.5	15
Wheelbase (in)	67	96
Climbing capacity	20%	20%
Front suspension	Independent A-arm with coil over shocks	Independent A-arm with coil over shocks
Rear suspension	Leaf spring and shock	Leaf spring and shock
Steering system	Rack and pinion	Rack and pinion
Brake system	4-wheel hydraulic disc	4-wheel hydraulic disc
Tire size	205 / 50 / 10, 6-ply DOT	205 / 50 / 10, 6-ply DOT
Tire pressure (psi)	32	32

Important Labels

WARNING Please read the following labels carefully before operating the vehicle, and promptly replace any labels which become unreadable or removed. “Security Warning” label under the dashboard:


Security Warning
Before-driving
erations to the vehicle are not allowed without the permission of the nufacturer. Operators of this vehicle must carefully read and understand operation and maintenance manual.All appropriate systems must be cked and repaired as required. Do not drive the vehicle if repairs and intenance is needed. Doing so could injure the occupants and/or damage vehicle.Only qualified individuals who have been properly trained are wed operate the vehicle.Flammable and/or explosive items are not rmitted in the vehicle at any time.The vehicle can only be operated in proved locations.
In-driving
ior to moving vehicle, all passengers must be securely seated. All ssengers must use armrest and keep body parts inside the vehicle at all hes. Avoid sudden turns and stops or any dramatic changes in speed. ways travel at an appropriate speed to insure safety to the occupants of e vehicle and others persons in the area.Obey all traffic laws and rules. perate the vehicle at a safe speed. When climbing a incline or slope, keep e front of the vehicle pointed up the slope in order to avoid a possible loss control and/or a "ollover" of the vehicle.
After-driving
ring the vehicle to a complete full stop by letting off the pressure on the ccelerator and depressing the foot brake.Turn the key to the "OFF" position nd remove the key. Engage the hand brake to secure the vehicle in place nd prevent unintentional movement.If parked on an incline or slope, in ddition to using the hand brake, the tires should be "locked" in order to revent unintentional movement of the vehicle.

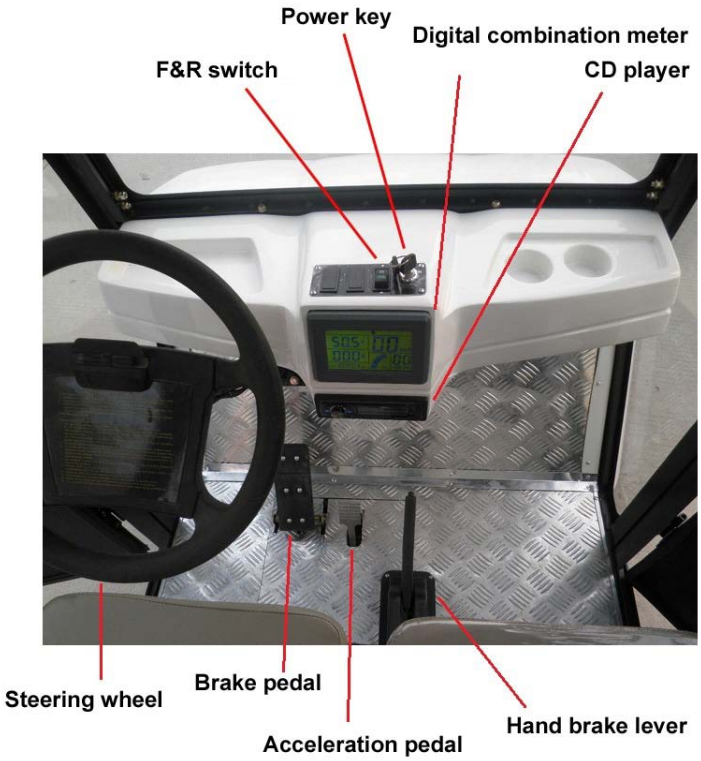
“Warning” label under the dashboard:

Warning
When washing your electric vehicle, avoid putting water in contact with any electrical parts.
The electric vehicle must be in a clean and good ventilated area when charging to reduce the risk explosion or fire.
The ignition key must be in the "OFF" position when charging the vehicle.
Check to make sure the cooling fan located in the charger is functioning properly during chargi process to avoid the charger overheating.
This vehicle is not intended for street use and/or on public roads. It should only be operated in safe area, as allowed by local rules and laws.

“Warning” label besides the parking-brake handle:

Operation System

Schematic Figure of Operation System



Functions of Operating System

Power Key: Controls the power supply of the whole vehicle. When the key is inserted and turned clockwise, it will switch on lights, horn and the control system; when the key is turned back, the power will be switched off.

Acceleration Pedal: Controls the speed. It should be depressed slowly. The vehicle speeds up with the gradual depressing, and reaches full speed when the pedal is stepped down completely. The vehicle slows down when the pedal being released gradually. When the pedal is fully released, electric brake works.

Brake pedal: Decelerates and stops the vehicle.

F&R switch: This switch is a three-position button. Pressing the upper part causes the vehicle to move forwards while depressing the lower part causes the golf car move in reverse, and the middle is neutral.

NOTE: The buzzer will beep when the Reverse is pressed.

Parking brake Lever: Park and brake the vehicle.

Steering Wheel: Controls the driving direction.

Headlight Switch: Controls the headlights.

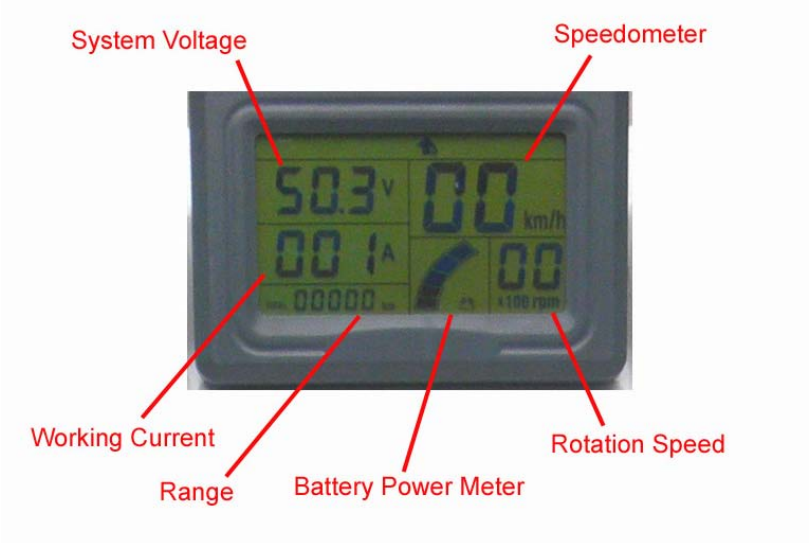
Turn Signal Switch: Controls the turning signal.

Wiper & Horn Switch: Controls the wiper and horn.

Emergency Stop Switch : Stops the power of the whole vehicle in case of an emergency.

NOTE: Before you switch on the vehicle, please always check the status of this switch to make sure that it is on OFF position.

Digital Combination meter: Please refer to following figure:



Operational Process

Starting the vehicle

- Select F for Forward or R for Reverse from F&R Switch.
- Switch on Power Key.
- Release the Parking Brake lever.
- Step down on the Acceleration Pedal smoothly.

WARNING

- If you switch on Power Key first before selecting Forward or Reverse on F&R switch, the vehicle will not run. In this case, please switch off Power Key, select Forward or Reverse, and step down on the Acceleration Pedal to start the vehicle.
- If you step down on the acceleration pedal before switching on the power key, the vehicle will not run.

Stopping the Vehicle

- Step on the Brake Pedal to decelerate the vehicle until it stops completely and shift F&R switch to the Neutral position.
- Engage the parking brake lever to park the vehicle.
- Release the service brake.
- Switch off all lights.
- Switch off the power and take out the key.

Charging the batteries

CAUTION

- There are two different kinds of charger for you to choose: an exterior charger and a built in (on-board) charger. Before you use the charger, please read the charger operation manual.
- Explosive hydrogen gas is produced while the batteries are charged. Only charge in well-ventilated areas.
- Before using the charger, please check if the battery charger you are using is correctly rated as per your local AC electricity network.
- Do not disconnect the DC output cord from the battery receptacle when the charger is ON. In this case an arc can occur which may cause an explosion.
- It is prohibited to open the housing of the charger.
- Only a qualified electrician is allowed to open the housing of the charger.
- The charger should be stored in safe and dry room with good ventilation.
- The charger should be packed properly if not used for long time.

Charging procedure

- Turn off the power of the whole vehicle.
- **Exterior charger:**
    - Connect charger to the DC receptacle on the vehicle.
        - Connect the charger to AC power.
        - Turn on the charger.
    - Turn off the charger when the batteries are fully charged. Disconnect the charger from AC power first, then disconnect the charger with DC receptacle.
- **Onboard (built-in) charger:**
    - Connect the charger(s) with AC power.
    - Turn on the charger(s).

- Turn off the charger(s) when the batteries are fully charged, and disconnect the charger(s) with AC power.

Rules for Safe Operation

The driver should have a good knowledge of the operation system of the vehicle and its features. Follow the rules for safe operation.

WARNING

- Drive the vehicle off road unless it is a street legal vehicle (NEV/LSV).
- The vehicle cannot be overloaded. Overloading the vehicle can cause damage to the motor and loss of control of the vehicle.
- Unqualified persons are prohibited to drive the vehicle.
- Make sure this vehicle runs in its rated climbing ability.
- Don't overtake other vehicles at crossroads, blind spots or in other dangerous areas.

WHILE OPERATING THE VEHICLE

- Keep your entire body inside the vehicle, keep seated and holding on while the vehicle is moving.
- Do not start the vehicle until all occupants are securely seated.
- Keep your hands on the steering wheel and your eyes on the path ahead.
- Always reverse the vehicle slowly and watch the back carefully.
- Avoid starting and stopping suddenly.
- Avoid turning the vehicle too sharply at high speeds.
- Always drive slowly up and down slopes.
- Do not make any modification or addition which may affect the capacity or safety of the vehicle.
- Children are not allowed to play in the vehicle. Children should be seated between adults and protected while the vehicle is moving.

Maintenance

Users should perform regular maintenance as follows.

Battery Maintenance

WARNING

Battery electrolyte is poisonous and dangerous, and may cause severe burns, injury, etc. Always wear protective clothing, gloves, and goggles when handling batteries, electrolyte, and charging your battery.

KEEP IT OUT OF REACH OF CHILDREN.

Cleaning

- The exterior of the battery, connection wires and bolts should always be kept clean and dry. When cleaning, make sure all vent caps are tightly in place. Clean the battery top with a cloth or brush and solution of baking soda and water. When cleaning, do not allow any cleaning solution or other foreign matter to get inside the battery. This should be done every week.
- Clean battery terminals and the inside of cable clamps using a post and clamp cleaner. Clean terminals will have a bright metallic shine. This should be done as needed.
- Reconnect the clamps to the terminals and thinly coat them with petroleum jelly (Vaseline) to prevent corrosion.

WARNING

Before you disconnect any battery cable from any terminal on the battery, please always remove the power by disconnecting the main battery cable from the controller.

Checking the terminals and nuts

The connection of the battery should always be kept in good condition. Check weekly on whether any battery cable terminal or nut has become loose in order to prevent sparks or damage to terminals. Check weekly on whether any battery cable is damaged, and a damaged battery cable should be replaced immediately.

Foreign matter

Do not place any objects on the battery and do not connect the positive pole to the negative pole. This may cause a short circuit, dangerous sparking or damage to the battery or injury to your body.

Recharging

- As long as you use the vehicle, regardless of how long you have used it, the battery should be recharged fully on the same day. Note: the lead-acid battery does not develop a memory, so it need not be fully discharged before recharging.
- If the vehicle is going to be kept unused for a certain long time, the battery should be fully recharged first. After that, the battery should be fully recharged every 2 weeks.
- When driving, the driver should be always aware of the drop level of the battery power from the battery power meter, any drop means the battery power is diminishing. The driver should estimate the distance needed to be taken, and recharge the battery at a proper time in case that the vehicle cannot get back to the recharging station in time for recharging.

WARNING

Make sure the battery is recharged before the battery power meter shows 20% power is left inside the battery. An over-discharged battery will have a shortened service life and will make recharging difficult.

WARNING

During recharging, the vehicle should be parked in a well-ventilated area with the fill caps tightly secured. Keep far away from any flame and sparks to avoid any explosion or fire that could cause physical injury or damage to the property.

During recharging, always lift the seat bottom to keep the battery compartment open to the air.

Watering

Flooded batteries need water. More importantly, watering must be done at the right time and in the right amount or else the battery's performance and longevity suffers. Water should always be added after fully charging the battery. Prior to charging, there should be enough water to cover the plates. If the battery has been discharged partially or fully, the water level should also be above the plates. Keeping the water at the correct level after a full charge will prevent having to worry about the water level at a different state of charge. Depending on the local climate, charging methods, application, etc., it is recommended that batteries be checked once a month.

Important things to remember:

- Do not let the plates get exposed to air. This will damage (corrode) the plates.
- Do not fill the water level in the filling well to the cap. This most likely will cause the battery to overflow acid, consequently losing capacity and causing a corrosion.
- Do not use water with a high mineral content. Use distilled or de-ionized water only.

WARNING: The electrolyte is a solution of acid and water so skin contact should be avoided.

Watering procedure:

- Open the vent caps and look inside the fill wells.
- Check electrolyte level; the minimum level is at the top of the plates.
- If necessary, add just enough water to cover the plates at this time.
- Put batteries on a complete charge before adding any additional water (refer to the Charging section).
- Once charging is completed, open the vent caps and look inside the fill wells.
- Add water until the electrolyte level is 1/8" below the bottom of the fill well.
- A piece of rubber can be used safely as a dipstick to help determine this level.
- Clean, replace, and tighten all vent caps.

CAUTION: Never add acid to a battery.

Testing

Visual inspection alone is not sufficient to determine the overall health of the battery. Both open-circuit voltage and specific gravity readings can give a good indication of the battery's charge level, age, and health. Routine voltage and gravity checks will not only show the state of charge but also help spot signs of improper pro, such as undercharging and over-watering, and possibly even locate a bad or weak battery. The following steps outline how to properly perform routine voltage and specific gravity testing on batteries.

Specific Gravity Test (Flooded batteries only)

- Do not add water at this time.
- Fill and drain the hydrometer 2 to 4 times before pulling out a sample.
- There should be enough sample electrolyte in the hydrometer to completely support the float.
- Take a reading, record it, and return the electrolyte back to the cell.
- To check another cell, repeat the 3 steps above.
- Check all cells in the battery.
- Replace the vent caps and wipe off any electrolyte that might have been spilled.
- Correct the readings to 80˚ F: Add .004 to readings for every 10˚ above 80˚ F Subtract .004 for every 10˚ below 80˚ F.
- Compare the readings.
- Check the state of charge using Table 1.

The readings should be at or above the factory specification of 1.277 +/- .007. If any specific gravity readings register low, then follow the steps below.

- Check and record voltage level(s).
- Put battery(s) on a complete charge.
- Take specific gravity readings again.

If any specific gravity readings still register low then follow the steps below.

- Check voltage level(s).
- Perform equalization charge. Refer to the Equalizing section for the proper procedure.
- Take specific gravity readings again.

If any specific gravity reading still registers lower than the factory specification of 1.277+/- .007 then one or more of the following conditions may exist:

1. The battery is old and approaching the end of its life.
2. The battery was left in a state of discharge too long.
3. Electrolyte was lost due to spillage or overflow.
4. A weak or bad cell is developing.
5. Battery was watered excessively previous to testing.

Batteries in conditions 1 - 4 should be taken to a specialist for further evaluation or retired from service.

Open-Circuit Voltage Test

For accurate voltage readings, batteries must remain idle (no charging, no discharging) for at least 6 hours, preferably 24 hours.

- Disconnect all loads from the batteries.
- Measure the voltage using a DC voltmeter.
- Check the state of charge with Table 1.
- Charge the battery if it registers 0% to 70% charged.

If battery registers below the Table 1 values, the following conditions may exist:

- The battery was left in a state of discharge too long.
- The battery has a bad cell.

Batteries in these conditions should be taken to a specialist for further evaluation or retired from service.

State of charge as related to specific gravity and open circuit voltage

Percentage of Charge	Specific Gravity Corrected to 80° F	Open-Circuit Voltage					
		6V	8V	12V	24V	36V	48V
100	1.277	6.37	8.49	12.73	25.46	38.20	50.93
90	1.258	6.31	8.41	12.62	25.24	37.85	50.47
80	1.238	6.25	8.33	12.50	25.00	37.49	49.99
70	1.217	6.19	8.25	12.37	24.74	37.12	49.49
60	1.195	6.12	8.16	12.24	24.48	36.72	48.96
50	1.172	6.05	8.07	12.10	24.20	36.31	48.41
40	1.148	5.98	7.97	11.96	23.92	35.87	47.83
30	1.124	5.91	7.88	11.81	23.63	35.44	47.26
20	1.098	5.83	7.77	11.66	23.32	34.97	46.63
10	1.073	5.75	7.67	11.51	23.02	34.52	46.03

Battery installation

Tighten the battery cables to battery terminals with torque of 95-105lbs.inch or 10.7-11.9 N.M. Make sure there is nothing else between the battery cable lug and battery terminal post.

WARNING: When working with the battery, DO NOT put wrenches or any other metal objects across the battery terminals. An arc can occur, and it may cause explosion of the battery and physical injury.

Batteries should be installed or replaced only by a qualified electrician.

Gear Box Maintenance

1. The clearance for the clutch should be kept between 2-3 mm.

2. The friction plate should be changed periodically; the friction value on one side should not exceed 2 mm.
3. Adjust the flatness of the platen spring plate (feeling manually): first tighten the screws diagonally, use your hand to check the flatness of the spring plate. If not flat, tighten the screws for the non-flat part.
4. Change the gear oil inside the gear box periodically (for new vehicle, change the oil after one month or accumulated running distance exceed 1,200 km; change the oil again two months later, then change the oil every six months.) The oil type is 85W/90GL.
5. Clean the gear box before changing the oil.

CAUTION: Never mix different oils.

Traction Motor Maintenance

- This traction motor is designed for use up to 4,000 ft altitude and at temperatures between -15˚F and 100˚F.
- This motor can work properly with a voltage produced by batteries in series.
- Never keep the motor running idly.
- Any mud, sand and other clinging objects should be cleaned away so as to provide good heat-radiation.
- Check the carbon brush every three months, change the worn carbon brush and weaken carbon brush press spring.

Trouble-Shooting for Motor

WARNING: Only a qualified electrician should change and adjust the carbon brush and commutator.

Item	Symptoms	Possible Causes
1	All copper plates turn black.	The pressure of brush is incorrect.
2	The commutator turns black in a certain order and in groups.	Short circuit in the commutator or armature coil; poor welding or disconnection between the commutators and the armature coil.
3	The commutator turns black in disorder.	The central line of the commutator deviates or its surface is not round and not smooth.
4	The brush wears out, turns	The motor vibrates; the clearance between the brush and its holder is too big; the clearance between the

	colors and become broken.	brush and commutators is too big; the mica between different commutators extrudes; the brush is made by wrong materials; the brush is wrong in type.
5	Sparking.	The motor is over-loaded; the commutators are not clean, not round or not smooth; mica or some commutators extrude; the brush is not ground properly; the brush is big in pressure; the brush is wrong in type; the brush is jammed in the brush holder; the brush holder become loose or vibrating; the polarity and sequence of magnetic poles become wrong.
6	The brush and its wires get hot.	Sparking of the brush; poor contact between brush and soft wires; small section area of soft wires.
7	The brush is noisy.	The surface of the commutators is not smooth.

Speed Controller Maintenance

The speed controller of the vehicle uses high frequency MOS technology to accomplish the control of speed, torque and brake with smoothness, silence, high efficiency.

The speed controller prevents the vehicle from running way when starts. When the vehicle starts, the controller will inspect the signal from the accelerator; if signal exceeds 20%, the HPD (protection unit in the controller) will prohibit the output of controller.

When the vehicle starts, the SRO (protection unit in the controller) will effect.

The controller will self-check when the vehicle is running. If any defect is inspected, the controller will stop the vehicle to protect the operator and the vehicle.

Periodical Maintenance:

- Check if the contacting points of the contactor are in good condition, and check if any contact sticks or is jammed mechanically.
- Check if the micro switch in the accelerator can be switched on and off properly.

- Check if the turn signal switch can be switched on and off properly.
- Check if all the connections between the motor, the battery, and the controller are in good condition.

Please use the following cleaning procedure for routine maintenance:

- Turn the power key to OFF position.
- Remove power by disconnecting the battery.
- Discharge the capacitors in the controller by connecting a load (such as a contactor coil or a horn) across the controller's B+ and B- terminals.
- Remove any dirt or corrosion from the connector areas. The controller should be wiped clean with moist rag. Dry it before reconnecting the battery. The controller should not be subjected to pressured water flow from either a standard hose or a pressure washer.
- Make sure the connections are tight, but do not over-tighten them.

NOTES: All above checks shall be performed under power off. Above checks shall be carried out once every 3 months; after the power key turns off, the wave-filter capacitor in the controller unit shall keep discharging for a few minutes more; don't wash the electrical parts with water. It is allowed to remove dust with a brush or high–pressure air.

Brake System Maintenance

- Step the brake pedal with a force of 30kg or so, the pedal travel shouldn't exceed 2/3 of the full free pedal travel.
- The clearance for the brake plate is self-adjusted. Under a force of around 20kgs, the parking brake handle should be fixed in one gear from 5 to 10 ratchet. When the brake handle is released completely, the brake function will stop.
- Inspect and change brake shoe, add lubrication into the brake bearing periodically.

Lubrication of the Whole Vehicle

- Use 901 vehicle brake oil DOT3 as brake oil.
- Use 1L of 85W/90GL lubrication oil for gear box.
- Use 1L of 90GL hypoid gear oil for the rear axle.
- Lubrication points: a. steering gears; b. horizontal bars; c. steering ball joints; d. bearings.

Lubrication Notes

- To avoid any damage on the brake shoe, handbrake should be released before staring the vehicle.
- The lubricant for rear power assembly must be applied and changed as per user's manual.
- The brake system must be adjusted once every 3 months.
- The electricity system must be checked once every 3 months (especially main circuit) for its fastening parts and wiring connections. Meanwhile the contactor should be checked, any defective parts should be replaced immediately. Its dust should be cleaned by low pressure air.
- The electric contactors easily become hot if their mutual contact is not in good condition, so special attention should be paid regularly to the electric contactors.
- When changing the fuse, make sure that the new fuse is right in rated current.
- For safety, disconnect the positive pole from the battery when maintenance is done.
- Never step on the accelerator pedal hard and frequently, which may shorten the life of the controller.
- It is prohibited to fill any other liquids (such as battery addictives, mineral water and tap water) into the battery, ONLY the distilled water is allowed to fill in the battery.
- Check periodic maintenance charts (below).
- Regular maintenance is required for the best performance and safe operation of the vehicle.

WARNING: Make sure to turn off the power key and apply the park brake when you do the maintenance unless specified. If the owner is not familiar with the maintenance of this vehicle, the dealer should do the work.

D – per day **W** – per week **M** – per month **Q** – per quarter **Y** – per year

Item	**Descriptions**	**D**	**W**	**M**	**Q**	**Y**
Battery	1. Check the liquid level. Please add the distilled water if necessary.	✓				
	2. Charge the battery	✓				
	3. Tighten the nut on the battery cable		✓			
	4. Check if the battery is over-discharged (the battery power meter flashing)	✓				
	5. Check the liquid density of the battery, standard density should be 1.275±0.005 (25℃).		✓			

	6. Check if the battery is charged fully by 3 ways: a) using the hydrometer; b) checking the battery power meter;	✓				
	7. Clean the surface of battery		✓			
Charger	8. Observe the charging status, check if the charger plug becomes hot.	✓				
	9. Clean the surface of the charger. Do not get any water inside the charger.		✓			
Controller	10. Check if all terminals are tightened properly. Please do this after the power is off.				✓	
	11. Clean the surface of the controller.				✓	
	12. Check if the solenoid is in order, checking its touching point.					✓
Motor	13. Check if any water gets in. Check if it becomes too hot.	✓				
	14. Check if the carbon brush should be replaced.					✓
	15. Check if the accelerator pedal works well and if it can be released freely and automatically.				✓	
Chassis and body	16. Check if the brake drum and the brake shoe should be replaced or not.				✓	
	17. Check if the hand brake functions.				✓	
	18. Check if the hose and tube for the brake liquid leaking.			✓		
	19. Check if the brake liquid inside the brake liquid tank is enough.			✓		
	20. Check the air pressure inside the tire, check if the tire surface is worn, check if the nuts are tightened properly.		✓			
	21. Check if the shock absorber has any oil leaking, flat or abnormal noise.			✓		

	22. Check if there is oil leaking on the gear box and the rear end.		✓			
	23. Add the lubricant inside the wheel hub, steering system.				✓	
	24. Adjust the toe-in of the front end.				✓	
	25. Clean the body and seat.				✓	
After above maintenance, drive the vehicle to check if the vehicle works properly.						

Storage

Please follow the steps as below when the vehicle is stored.

1. Check the liquid level inside the battery; recharge it fully before storing the vehicle.

   WARNING: Charge the battery once a month if your vehicle will be stored more than one month.

2. Turn the power key to OFF position, remove the key, and store the key in a safe position.
3. Engage the parking brake.
4. Check the tire pressure to make sure its pressure is set to recommended pressure.
5. Clean the exterior of the vehicle and apply the rust inhibitor.
6. Cover the vehicle with a breathable cover and store it in a dry, safe and well-ventilated place.
7. If the vehicle is to store for a longer time, check the liquid level inside the battery once a month and recharge the battery.

Trouble Shooting

There is no settled mode to diagnose and eliminate the malfunction of electric shuttle buss. During maintaining and checking, we suggest you first listen, then look and feel. Below is the diagnoses and maintenance of some common malfunctions.

1. **The vehicle doesn't move.**

Malfunction	**Possible reason**	**Troubleshooting**
Turn on power key, Voltmeter has no signal	Connector(s) in Circuit is loose or open	Tighten or connect
	Fuse of controller or main circuit is open	Change fuse
	Battery cable(s) is loose or disconnected	Tighten or change
	Power key is broken	Change
	Voltmeter is broken	Change
	Battery terminals connect improperly	Adjust
Turn on power key, Voltmeter has signal.	Improper operating procedure	Operate properly
	Controller Failure	Check or Change
	Solenoid Failure	Check, repair, change
	Accelerator Failure	Repair or Change
	Motor Failure	Repair or change
	Parking brake doesn't loosen	Loosen parking brake
	Over-heat protection	Check, eliminate

2. **Loses control when vehicle starts running, speed cannot be adjusted.**

Malfunction	**Possible reason**	**Troubleshooting**
Vehicle runs at full speed when it starts	Terminals of Solenoid stick together	Check, repair
	Controller failure	Change
	Potentiometer failure	Repair, change
Vehicle stops immediately after	Internal short of Motor	Repair, change
	Motor is assembled too tight or blocked	Repair, change

it starts	Controller failure	Repair, change
	Accelerator Failure	Repair, change
Normal at low speed, Weak power at high speed	Controller Failure	Check, change
	Motor Failure	Check, change
	Accelerator Failure	Check, change

3. Vehicle cannot change direction, only runs in one direction

Malfunction	Possible reason	Troubleshooting
Vehicle can only run in one direction	F&R switch failure	Change
	Controller Failure	Change

4. Malfunction of electro-mechanic system

System	Malfunction	Possible reason	Troubleshooting
Transmission System	Abnormal sound when running	Clearance of rear axle decelerating gear is too big, or the decelerating gear is broken	Adjust, change
		Transmission cross shaft wear out	Change
		Gear of transmission wear out or damage	Change
		Flange bearing damage	Change
		Motor bearing damage	Change
		Gear liquid is deficient or empty	Add Gear liquid
	Hard to shift gear, and/or gear shift jumps in different	Clutch cannot separate smoothly	Adjust
		Gear shift cable damage	Change

	positions	Gear inside transmission case wear out	Change
		Orientation pin loosen	Change
Steering System	Steering heavy	Pressure of front tire is deficient.	Check the pressure and Inflate
		Screw plug of Redirector is too tight	Adjust
		Lack of lube in redirector	Maintain, add lube
		Toe-in abnormal	Adjust
		Clearance of tension rod ball is too big	Change
		Steering knuckle and master pin is not lubricating	Add Lube
		Steering shaft or its plastic cover wear out	Change
	Steering unstable	Rack of redirector wear out	Change Redirector
		Screw plug of Redirector is too tight	Adjust
		Toe-in adjust improperly	Adjust
		Bearing of front wheel wear out	Change
		Tie rod ball and joint wear out	Change tie rod
		Redirector loose	Tighten
Driving System	Deflected Running	The pressure of the two front tires is different	Inflate
		Toe-in is too big or too small	Adjust
		Tightness of the left and right drum bearing of front wheels is different	Adjust

		Brake of one wheel is too tight	Adjust or Change
		Spring shock absorber is abnormal	Change
		Front suspension loose	Change
	Abnormal Tire Fray	Tire pressure is abnormal or tires need to be rotated	Inflate or rotate
		Toe-in is improper	Adjust
		Drum bearing loose	Change
		U type Bolt of Leaf Spring loose	Tighten
		Rim distort, frame distort	Tighten
		Brake force of each wheel is different	Adjust
		Overexert accelerate or brake frequently	Alter operation
Brake System	Brake fail	Master cylinder and/or wheel cylinder damage, vitta leak oil	Check, eliminate, change
		Brake fluid is insufficient or empty	Add fluid
		Air enters into oil pipe	Let air
		Free travel of Brake pedal is too long or the clearance of arrester is too big	Adjust
		Brake drum wears out or distort	Change
		Master cylinder leaks oil internally	Change
	Braking deviation	The clearance of left brake drum shoe and right brake drum shoe is different	Adjust
		Oil on one arrester's brake shoe	Dispose or change

		Tire pressure is different	Repair or Change
		One wheel cylinder's piston blocks	Adjust
		Wheel alignment improperly	Adjust
		Brake drum becomes out of round	Change
	Braking drag	Brake pedal has no free travel	Adjust
		Clearance between brake shoe and drum is too small or releasing spring is disable.	Adjust or Change
		Piston of wheel cylinder is ineffective	Check、Change
		Piston of master cylinder is ineffective	Change
		Parking brake is ineffective	Change spring
	Braking noise	Shoes distort	Change
		Brake facing wear out	Change
		Brake drum breach, scrape to uneven	Change

This manual tries to be as sound and elaborate as possible in literal and figurative description as well as technical description on the basis of existing data. At the same time, JH Global reserves the right to alter the content of this manual and this manual is subject to change without prior notice; in addition, JH Global has the final say on the interpretation of this manual.

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